

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark  
Office  
(Box PCT)  
Crystal Plaza 2  
Washington, DC 20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 21 July 1999 (21.07.99)	<b>Applicant's or agent's file reference</b> Case 580 PCT
<b>International application No.</b> PCT/SE98/01997	<b>Priority date (day/month/year)</b> 13 November 1997 (13.11.97)
<b>International filing date (day/month/year)</b> 04 November 1998 (04.11.98)	
<b>Applicant</b> BRAUNER, Manfred	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

02 June 1999 (02.06.99)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer F. Baechler</p> <p>Telephone No.: (41-22) 338.83.38</p>
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# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

To:

Stenberg, Yngve  
c/o Perstorp AB  
284 80 PERSTORP

### NOTIFICATION OF RECEIPT OF DEMAND BY COMPETENT INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

(PCT Rules 59.3(e) and 61.1(b), first sentence  
and Administrative Instructions, Section 601(a))

Date of mailing  
(day/month/year)

02 -06- 1999

Applicant's or agent's file reference

Case 580 PCT

#### IMPORTANT NOTIFICATION

International application No.

PCT/SE98/01997

International filing date (day/month/year)

04-11-1998

Priority date (day/month/year)

13-11-1997

Applicant

Perstorp AB  
et al

1. The applicant is hereby notified that this International Preliminary Examining Authority considers the following date as the date of receipt of the demand for international preliminary examination of the international application:

**02-06-1999**

2. This date of receipt is:

☒

the actual date of receipt of the demand by this Authority (Rule 61.1(b)).

☐

the actual date of receipt of the demand on behalf of this Authority (Rule 59.3(e)).

☐

the date on which this Authority has, in response to the invitation to correct defects in the demand (Form PCT/IPEA/404), received the required corrections.

3. ☐

**ATTENTION:** That date of receipt is **AFTER** the expiration of 19 months from the priority date. Consequently, the election(s) made in the demand does (do) not have the effect of postponing the entry into the national phase until 30 months from the priority date (or later in some Offices) (Article 39(1)). Therefore, the acts for entry into the national phase must be performed within 20 months from the priority date (or later in some Offices) (Article 22). For details, see the *PCT Applicant's Guide*, Volume II.

☐

(If applicable) This notification confirms the information given by telephone, facsimile transmission or in person on:

4. Only where paragraph 3 applies, a copy of this notification has been sent to the International Bureau.

Name and mailing address of the IPEA/  
Patent- och registreringsverket  
Box 5055  
S-102 42 STOCKHOLM  
Facsimile No. 08-687 72 88

Telex  
17978  
PATOREG-S

Authorized officer

Pernilla Hjert

Telephone No.

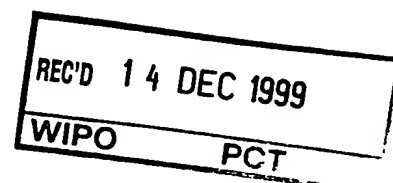
08-782 25 00

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference Case 580 PCT	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SE98/01997	International filing date (day/month/year) 04.11.1998	Priority date (day/month/year) 13.11.1997
International Patent Classification (IPC) or national classification and IPC <sub>6</sub> B 29 C 45/00		
Applicant Perstorp AB et al		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of _____ sheets.</p>
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>

Date of submission of the demand 02.06.1999	Date of completion of this report 11.10.1999
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Eric Björkman/ELY Telephone No. 08-782 25 00

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/01997

## I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

- ☒ the international application as originally filed.
- ☐ the description, pages \_\_\_\_\_, as originally filed,  
pages \_\_\_\_\_, filed with the demand,  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☐ the claims, Nos. \_\_\_\_\_, as originally filed,  
Nos. \_\_\_\_\_, as amended under Article 19,  
Nos. \_\_\_\_\_, filed with the demand,  
Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☐ the drawings, sheets/fig \_\_\_\_\_, as originally filed,  
sheets/fig \_\_\_\_\_, filed with the demand  
sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/01997

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-6</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-6</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-6</u>	YES
	Claims		NO

**2. Citations and explanations**Invention

The invention relates to a flat or semi-flat element including a partly or completely circumambient frame. The element is manufactured through moulding a polymeric material including a carrying structure constituted by the frame and an intermediate section connected to the frame via a resilient section. The resilient section is a part of the wall section, wherein differences in temperature related shrinkage between the frame and the wall section are absorbed. Thus, warping of the element is avoided.

Reasoned statement

The abstracts of JP8267493, JP4164609, JP4284214 and JP42011529 are considered to be the closest prior art. The document discloses different techniques to produce flat or semi-flat articles without warping. None of the cited documents discloses the use of a resilient section, wherein differences in temperature related shrinkage between the frame and the wall section are absorbed to avoid warping. Therefore, the claimed invention as stated in claims 1-6 is considered to involve an inventive step.

Conclusion

Consequently, the document cited in the search report only discloses the general state of the art. Claims 1-6 fulfil the requirements of novelty, inventive step and industrial applicability.

## PATENT COOPERATION TREATY

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NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

STENBERG, Yngve  
Perstorp AB  
S-284 80 Perstorp  
SUÈDE

Date of mailing (day/month/year) 27 May 1999 (27.05.99)		IMPORTANT NOTICE	
Applicant's or agent's file reference Case 580 PCT			
International application No. PCT/SE98/01997	International filing date (day/month/year) 04 November 1998 (04.11.98)	Priority date (day/month/year) 13 November 1997 (13.11.97)	
Applicant PERSTORP AB et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:  
AU,CN,EP,IL,JP,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:  
AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CU,CZ,DE,DK,EA,EE,ES,FI,GB,GE,GH,GM,HR,HU,ID,  
IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,  
SI,SK,SL,TJ,TM,TR,TT,UA,UG,UZ,VN,YU,ZW  
The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).
3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on  
27 May 1999 (27.05.99) under No. WO 99/25532

**REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)**

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a **demand for international preliminary examination** must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

**REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))**

If the applicant wishes to proceed with the international application in the **national phase**, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. (41-22) 740.14.35	Authorized officer  J. Zahra  Telephone No. (41-22) 338.83.38
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# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>Case 580 PCT</b>	<div style="display: flex; justify-content: space-between;"> <div><b>FOR FURTHER ACTION</b></div> <div>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</div> </div>
International application No. <b>PCT/SE 98/01997</b>	<div style="display: flex; justify-content: space-between;"> <div>International filing date (<i>day/month/year</i>) <b>4 November 1998</b></div> <div>(Earliest) Priority Date (<i>day/month/year</i>) <b>13 November 1997</b></div> </div>
Applicant <b>Perstorp AB et al</b>	

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
  
2. ☐ Unity of invention is lacking (See Box II).
  
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing
 

☐ filed with the international application.  
☐ furnished by the applicant separately from the international application,  

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ transcribed by this Authority.
  
4. With regard to the title, ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:
  
5. With regard to the abstract,
 

☒ the text is approved as submitted by the applicant.  
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
  
6. The figure of the drawings to be published with the abstract is:
 

Figure No. 1

☐ as suggested by the applicant.
 

☐ None of the figures.

☒ because the applicant failed to suggest a figure.  
☐ because this figure better characterizes the invention.

## PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION CONCERNING  
SUBMISSION OR TRANSMITTAL  
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

STENBERG, Yngve  
Perstorp AB  
S-284 80 Perstorp  
SUÈDE

Date of mailing (day/month/year) 05 January 1999 (05.01.99)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference Case 580 PCT	
International application No. PCT/SE98/01997	
International publication date (day/month/year) Not yet published	
International filing date (day/month/year) 04 November 1998 (04.11.98)	Priority date (day/month/year) 13 November 1997 (13.11.97)
Applicant PERSTORP AB et al	

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(\*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
13 Nove 1997 (13.11.97)	9704153-7	SE	18 Dece 1998 (18.12.98)

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile N. (41-22) 740.14.35

Authorized officer

Juan Cruz



Telephone No. (41-22) 338.83.38



# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum)

Case 580 PCT

**Box No. I TITLE OF INVENTION**  
Flat or semi-flat element including a frame

**Box No. II APPLICANT**

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Perstorp AB  
S-284 80 Perstorp  
Sweden

☐ This person is also inventor.

Telephone No.  
+46 435 38000

Facsimile No.  
+46 435 38100

Teleprinter No.  
72000 perstp s

State (that is, country) of nationality:  
SE

State (that is, country) of residence:  
SE

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

**Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)**

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Brauner, Manfred  
Spohrstrasse 55  
A-1130 Wien  
Austria

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:  
AT

State (that is, country) of residence:  
AT

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Stenberg, Yngve  
c/o Perstorp AB  
S-284 80 Perstorp  
Sweden

Telephone No.  
+46 435 38310

Facsimile No.  
+46 435 38920

Teleprinter No.  
72000 perstp s

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No.V DESIGNATION OF STATES**

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

**Regional Patent**

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

**National Patent (if other kind of protection or treatment desired, specify on dotted line):**


- |  |  |
|--|--|
| <input checked="" type="checkbox"/> AL Albania                               | <input checked="" type="checkbox"/> LS Lesotho                                   |
| <input checked="" type="checkbox"/> AM Armenia                               | <input checked="" type="checkbox"/> LT Lithuania                                 |
| <input checked="" type="checkbox"/> AT Austria                               | <input checked="" type="checkbox"/> LU Luxembourg                                |
| <input checked="" type="checkbox"/> AU Australia                             | <input checked="" type="checkbox"/> LV Latvia                                    |
| <input checked="" type="checkbox"/> AZ Azerbaijan                            | <input checked="" type="checkbox"/> MD Republic of Moldova                       |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina                | <input checked="" type="checkbox"/> MG Madagascar                                |
| <input checked="" type="checkbox"/> BB Barbados                              | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BG Bulgaria                              | <input checked="" type="checkbox"/> MN Mongolia                                  |
| <input checked="" type="checkbox"/> BR Brazil                                | <input checked="" type="checkbox"/> MW Malawi                                    |
| <input checked="" type="checkbox"/> BY Belarus                               | <input checked="" type="checkbox"/> MX Mexico                                    |
| <input checked="" type="checkbox"/> CA Canada                                | <input checked="" type="checkbox"/> NO Norway                                    |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein  | <input checked="" type="checkbox"/> NZ New Zealand                               |
| <input checked="" type="checkbox"/> CN China                                 | <input checked="" type="checkbox"/> PL Poland                                    |
| <input checked="" type="checkbox"/> CU Cuba                                  | <input checked="" type="checkbox"/> PT Portugal                                  |
| <input checked="" type="checkbox"/> CZ Czech Republic                        | <input checked="" type="checkbox"/> RO Romania                                   |
| <input checked="" type="checkbox"/> DE Germany                               | <input checked="" type="checkbox"/> RU Russian Federation                        |
| <input checked="" type="checkbox"/> DK Denmark                               | <input checked="" type="checkbox"/> SD Sudan                                     |
| <input checked="" type="checkbox"/> EE Estonia                               | <input checked="" type="checkbox"/> SE Sweden                                    |
| <input checked="" type="checkbox"/> ES Spain                                 | <input checked="" type="checkbox"/> SG Singapore                                 |
| <input checked="" type="checkbox"/> FI Finland                               | <input checked="" type="checkbox"/> SI Slovenia                                  |
| <input checked="" type="checkbox"/> GB United Kingdom                        | <input checked="" type="checkbox"/> SK Slovakia                                  |
| <input checked="" type="checkbox"/> GE Georgia                               | <input checked="" type="checkbox"/> SL Sierra Leone                              |
| <input checked="" type="checkbox"/> GH Ghana                                 | <input checked="" type="checkbox"/> TJ Tajikistan                                |
| <input checked="" type="checkbox"/> GM Gambia                                | <input checked="" type="checkbox"/> TM Turkmenistan                              |
| <input checked="" type="checkbox"/> GW Guinea-Bissau                         | <input checked="" type="checkbox"/> TR Turkey                                    |
| <input checked="" type="checkbox"/> HR Croatia                               | <input checked="" type="checkbox"/> TT Trinidad and Tobago                       |
| <input checked="" type="checkbox"/> HU Hungary                               | <input checked="" type="checkbox"/> UA Ukraine                                   |
| <input checked="" type="checkbox"/> ID Indonesia                             | <input checked="" type="checkbox"/> UG Uganda                                    |
| <input checked="" type="checkbox"/> IL Israel                                | <input checked="" type="checkbox"/> US United States of America                  |
| <input checked="" type="checkbox"/> IS Iceland                               |  |
| <input checked="" type="checkbox"/> JP Japan                                 |  |
| <input checked="" type="checkbox"/> KE Kenya                                 | <input checked="" type="checkbox"/> UZ Uzbekistan                                |
| <input checked="" type="checkbox"/> KG Kyrgyzstan                            | <input checked="" type="checkbox"/> VN Viet Nam                                  |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> YU Yugoslavia                                |
|  | <input checked="" type="checkbox"/> ZW Zimbabwe                                  |
| <input checked="" type="checkbox"/> KR Republic of Korea                     |  |
| <input checked="" type="checkbox"/> KZ Kazakhstan                            |  |
| <input checked="" type="checkbox"/> LC Saint Lucia                           |  |
| <input checked="" type="checkbox"/> LK Sri Lanka                             |  |
| <input checked="" type="checkbox"/> LR Liberia                               |  |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

☐ .....

☐ .....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 13 November 1997	9704153-7	Sweden		
item (2)				
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): <u>9704153-7</u>				
<small>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</small>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):  <b>ISA / SE</b>		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority): Date (day/month/year)      Number      Country (or regional Office) 13 November 1997      SE 97/01411      Sweden		
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
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S-284 80 Perstorp/Sweden

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<b>(51) International Patent Classification <sup>6</sup> :</b>  <b>B29C 45/00</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 99/25532</b>  <b>(43) International Publication Date:</b> 27 May 1999 (27.05.99)
<b>(21) International Application Number:</b> PCT/SE98/01997 <b>(22) International Filing Date:</b> 4 November 1998 (04.11.98) <b>(30) Priority Data:</b> 9704153-7                      13 November 1997 (13.11.97)      SE <b>(71) Applicant (for all designated States except US):</b> PERSTORP AB [SE/SE]; S-284 80 Perstorp (SE). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> BRAUNER, Manfred [AT/AT]; Spohrstrasse 55, A-1130 Wien (AT). <b>(74) Agent:</b> STENBERG, Yngve; Perstorp AB, S-284 80 Perstorp (SE).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> FLAT OR SEMI-FLAT ELEMENT INCLUDING A FRAME  <b>(57) Abstract</b>  Flat or semi-flat element (1) including a partly or completely circumambient frame (2), which element (1) is manufactured through moulding of a polymeric material. The element (1) includes a carrying structure, constituted by the frame (2), and an intermediate wall section (3). The wall section (3) is connected to the frame (2) via a resilient section (4), the resilient section (4) being a part of the wall section (3). The differences in the temperature related shrinkage between the frame (2) and the wall section (3) is absorbed by the resilient section (4), whereby warping of the element (1) is avoided.		

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**Flat or semi-flat element including a frame**

The present invention relates to a flat or a semi-flat element including a partly or completely circumambient frame and an intermediate wall section.

Products made of plastic material are seen almost everywhere today. One way of manufacturing these products is through injection moulding of a thermoplastic material. It is a well known fact that the material thickness in such injection moulded products may not differ too much within the product since problems with warping will otherwise occur. This warping is caused by the temperature related shrinking, which is relatively great in most thermoplastic materials. An injection moulded product will normally be removed from the mould before it is completely cooled since the cycle time is an important economical factor in plastic manufacturing. The remainder of the cooling will hereby take place outside the mould. The shrinkage is related to the temperature which means that a part removed from the mould when hot will shrink more than a part removed when cold since some of the natural shrinkage can be counteracted by "freezing" the shape of the part in the mould. This means that thicker parts, which naturally contains more heat than thinner parts in the same product, will continue to shrink when cooling outside the mould. This will inevitably cause warping in the product. This problem has so far been prevented by designing the products with uniform material thickness.

There are however some cases where it would have been an advantage to be able to design products with different material thicknesses. One such example is containers where the walls and the bottom does not have to be particularly strong and the carrying structure of the container has to be strong since a lot of containers are to be stacked on top of each other, adding load to the container in the bottom of the stack. The thickness of the side walls and the bottom will in this case have to be over-dimensioned to be adapted to the injection moulding process since the carrying structure has to be sturdy. This will lead to a container heavier than necessary and that more material than necessary is used. This will of course lead to an uneconomical product.

According to the present invention it is possible to manufacture a product where the above mentioned disadvantages are avoided. The invention relates to a flat or semi-flat element including a partly or completely circumambient frame. The element is manufactured through moulding of a polymeric material, preferably injection moulding of a thermoplastic material. The invention is characterised in that the element includes a carrying structure, constituted by the frame, and an

intermediate wall section. The wall section is connected to the frame via a resilient section which is a part of the wall section. The differences in the temperature related shrinkage between the frame and the wall section is hereby absorbed by the resilient section whereby warping of the element is avoided. The frame is preferably constituted by a U-shaped profile, a number of tightly placed ribs, a closed hollow profile or the like. The wall section is suitably connected to the frame at or at least near to the gravity centre line of the frame.

According to one embodiment of the invention the frame is a closed hollow profile formed through injection of a pressurised fluid into a still molten thermoplastic material. The material thickness of the wall section is thinner closest to the connection between the frame and the wall section than the average thickness of the wall section and the frame, whereby a barrier is formed in this connection part at the solidification of the thermoplastic material. The barrier prevents the pressurised fluid from entering the wall section during the manufacturing process.

The hollow profiles can suitably be achieved by substantially filling the mould with molten thermoplastic material from an injection nozzle. The molten thermoplastic material is then allowed to solidify somewhat on the surface closest to the inner walls of the mould cavity. A pressurised fluid, preferably a gas, is thereafter injected through an intake suitably placed at one end of the profile. The gas is allowed to flow into the still molten plastic in the core of the profile wherein a cavity is formed in the profile. The surplus of still molten plastic is hereby ejected from the mould cavity. An element of this type can suitably be made from a thermoplastic material selected from the group, polyethylene, polypropylene, polyamide, polystyrene, acryl-butadiene-styrene, polyalkylene-terephthalate or the like.

The material thickness of the wall section is suitably thinner closest to the connection between the frame and the wall section than the average thickness of the wall section and the frame, whereby a pivot line is formed. The pivot line will facilitate resilient action in the wall section.

The element suitably forms a side wall of a container or a collapsible container, a bottom section of a container or a collapsible container or a lid of a container or the like.

The invention is explained further together with enclosed drawings, showing different embodiments of the invention wherein,



-figure 1 shows, in perspective a first embodiment of an element 1 with a frame 2 and an intermediate wall section 3 .

-figure 2a - 2d show, in cross-section, parts of different embodiments of an element 1 with profiles constituting the frame 2 of the element 1.

Figure 1 shows, in perspective one embodiment of an element 1 with a frame 2 and an intermediate wall section 3. The element 1 includes a carrying structure constituted by the frame 2, and an intermediate wall section 3. The wall section 3 is connected to the frame 2 via a resilient section 4. The resilient section 4 is a part of the wall section 3. Differences in the temperature related shrinkage between the frame 2 and the wall section 3 is absorbed by the resilient section 4 whereby warping of the element 1 is avoided.

Figure 2a - 2d show, in cross-section, parts of different embodiments of an element 1 with profiles constituting a frame 2 of the element 1. The element 1 includes a carrying structure, constituted by the frame 2, and an intermediate wall section 3. The wall section 3 is connected to the frame 2 via a resilient section 4. The resilient section 4 is a part of the wall section 3. The frame 2 is constituted by a U-shaped profile (fig. 2b), a number of tightly placed ribs (fig. 2d), a closed hollow profile (fig. 2a) or an L-shaped profile (fig. 2c). The wall section 3 is connected to the frame 2 at or very close to the gravity centre line 5 of the frame 2. The frame 2 is constituted by a closed hollow profile (fig. 2a) formed through injection of a pressurised fluid into a still molten thermoplastic material. The material thickness of the wall section 3 is thinner closest to the connection between the frame 2 and the wall section 3 than the average thickness of the wall section 3 and the frame 2, whereby a barrier is formed, in this connection part at the solidification of the thermoplastic material, which barrier, prevents the pressurised fluid from entering the wall section 3 during the manufacturing process. This thinner part will also act as a pivot line (Fig. 2a - 2b). The pivot line will facilitate resilient action in the wall section 3.

The intermediate wall section 3 can also be provided with a number of holes. These holes can be of different shape and size, depending on the requirements. Such holes are normally used in transport containers when ventilation is required.

The invention is not limited to the embodiments shown, since it can be varied in different ways within the scope of the invention.

**CLAIMS**

1. Flat or semi-flat element (1) including a partly or completely circumambient frame (2), which element (1) is manufactured through moulding of a polymeric material, preferably injection moulding of a thermoplastic material, characterised in that the element (1) includes a carrying structure, constituted by the frame (2), and an intermediate wall section (3), which wall section (3) is connected to the frame (2) via a resilient section (4), the resilient section (4) being a part of the wall section (3), wherein differences in the temperature related shrinkage between the frame (2) and the wall section (3) is absorbed by the resilient section (4) whereby warping of the element (1) is avoided.
2. Flat or semi-flat element (1) according to claim 1 characterised in that the frame (2) is formed by a U-shaped profile, a number of tightly placed ribs, a closed hollow profile or the like.
3. Flat or semi-flat element (1) according to claim 1 or 2 characterised in that the wall section (3) is connected to the frame (2) at or very close to the gravity centre line (5) of the frame (2).
4. Flat or semi-flat element (1) according to any of the claims 1 - 3 characterised in that the frame (2) is a closed hollow profile formed through injection of a pressurised fluid into a still molten thermoplastic material, that the material thickness of the wall section (3) is thinner closest to the connection between the frame (2) and the wall section (3) than the average thickness of the wall section (3) and the frame (2), whereby a barrier is formed in this connection part at the solidification of the thermoplastic material, which barrier prevents the pressurised fluid from entering the wall section (3) during the manufacturing process.
5. Flat or semi-flat element (1) according to any of the claims 1 - 3 characterised in that the material thickness of the wall section (3) is thinner closest to the connection between the frame (2) and the wall section (3) than the average thickness of the wall section (3) and the frame (2), whereby a pivot line is formed, which pivot line facilitates resilient action in the wall section (3).
6. Flat or semi-flat element (1) according to any of the claims 1 - 5 characterised in that the element (1) forms a side wall of a container or a collapsible container, a bottom section of a container or a collapsible container or a lid of a container or the like.

1

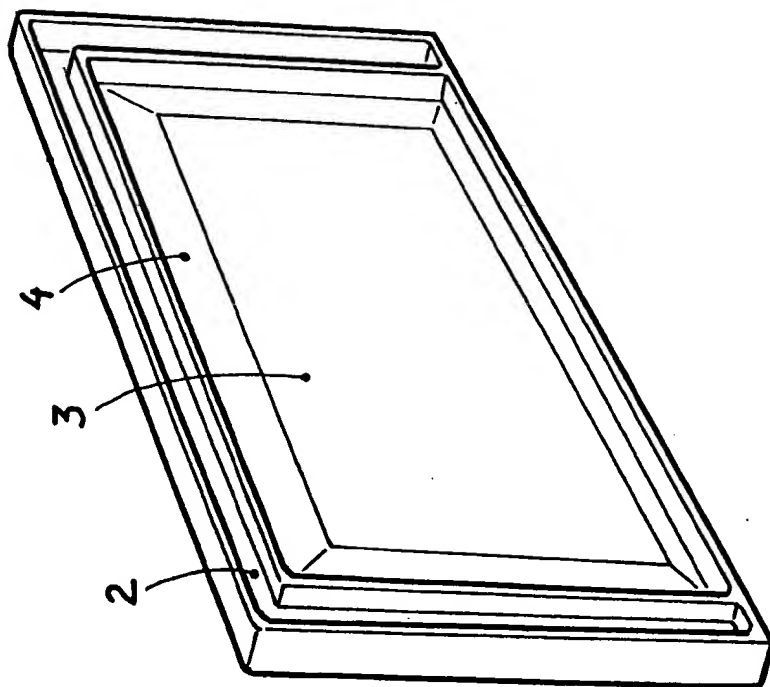
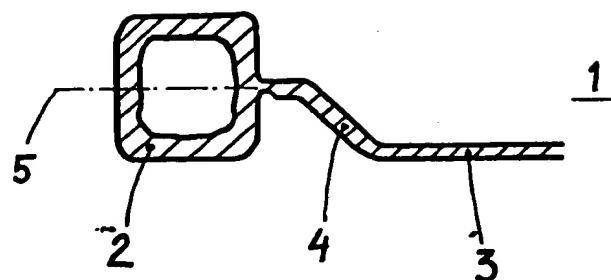
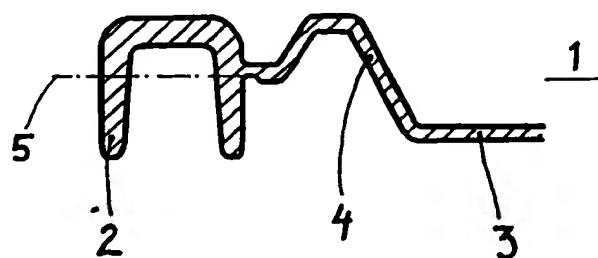
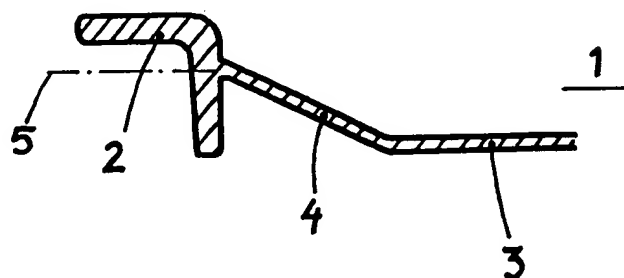
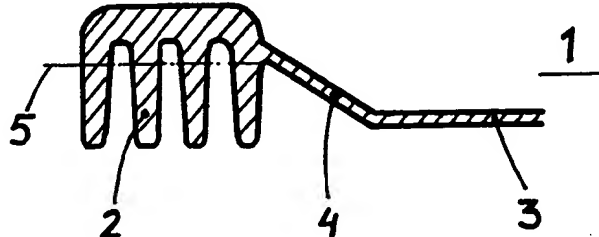


Fig. 1

Fig. 2aFig. 2bFig. 2cFig. 2d

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/01997

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B29C 45/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Patent Abstracts of Japan, abstract of JP 82-67493 A (ASAHI CHEM IND CO LTD), 15 October 1996 (15.10.96) --	1-6
A	Patent Abstracts of Japan, abstract of JP 4-164609 A (MITSUBISHI MOTORS CORP), 10 June 1992 (10.06.92) --	1-6
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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	<p>WPI/Derwent's abstract, Accession Number 92-295128, week 9236, ABSTRACT OF JP, 4201529 (MATSUSHITA ELEC IND CO LTD), 22 July 1992 (22.07.92); Patent Abstract of Japan, JP 4201529, vol. 16, no. 538, 9 November 1992</p> <p>-- -----</p>	1-6